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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/833,720	04/12/2001	Eric K. Hall	907B.0004USU	5508

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EXAMINER	
CHANG, RICHARD	
ART UNIT	**PAPER NUMBER**
2663	

DATE MAILED: 07/12/2005

Please find below and/or attached an Office communication concerning this application or proceeding.

SM

Office Action Summary	Application No.	Applicant(s)	
	09/833,720	HALL ET AL.	
	Examiner	Art Unit	
	Richard Chang	2663	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *23 February 2005*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-19* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *4 and 8-10* is/are allowed.

6)☒ Claim(s) *1-3, 5-7 and 11-19* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☐ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

DETAILED ACTION

Response to Amendment

1. Applicant's arguments and amendments with respect to claims 1-19 have been fully considered but are moot in view of the new ground(s) of rejection.

Claim Rejections - 35 USC § 103

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

3. Claims 1-3, 5-7 and 11-19 are rejected under 35 U.S.C. 103(a) as being unpatentable over US patent No. 6,347,234 ("Scherzer") in view of US patent 6,370,129 ("Huang").

Regarding claims 1 and 5, Scherzer teaches a practical wireless communication systems and methods for enhancement by exploiting the spatial domain (a synchronous space division multiple access, code division multiple access communications system) (See Fig. 1) comprising of

assigning the same spreading code is inherent in IS-95 CDMA system, and the Scherzer system conforms with IS-95, to a plurality of subscriber stations within a coverage area to the base station (See Fig. 1, Col 7, lines 21-23), and

beamforming using an antenna array (10, also as 40 in the Fig. 1) at the base station (See Fig. 1, Col 6, lines 39-42) inherently following the beamforming principle cited in background section that the uplink signal is received with maximum sensitivity and distinguished from the signals transmitted by other subscribers (so as to maximize the signal ... a desired subscriber stations) by selecting the beam to direct nulls to other subscribers so that cochannel interference is reduced (by steering a null towards ... the same-code). (See Col 2, line 66 to Col 3, line 5).

Scherzer teaches substantially all the claimed invention but did not disclose expressly the particular application involving limitations of "feedback detector corresponds to the nulling, ordering, and canceling operations".

Huang teaches a feedback detector corresponds to the nulling, ordering, and canceling operations to take advantage of multiple receive antennas using space-time multi-user detection (See Col. 5, line 62 - Col. 6, line 24).

A person of ordinary skill in the art would have been motivated to employ Huang in Scherzer in order to obtain a practical wireless communication systems and methods for enhancement by exploiting the spatial domain and to take advantage of a feedback detector corresponds to the nulling, ordering, and canceling operations to take advantage of multiple receive antennas using space-time multi-user detection in claims 1 and 5.

The suggestion/motivation to do so would have been to take advantage of a feedback detector corresponds to the nulling, ordering, and canceling operations to take advantage of multiple receive antennas using space-time multi-user detection, as

suggested by Huang in Col. 5, line 62 - Col. 6, line 24. At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Huang with the Scherzer to obtain the inventions specified in claims 1 and 5.

Regarding Claims 2,6 and 11, as discussed above, Scherzer teaches substantially all the claimed invention but did not disclose expressly the particular application involving limitation of "the antenna array has M-elements, wherein individual ones of P orthogonal spreading codes are reused between 1 and M times within the coverage area".

Huang teaches wireless communications systems and methods employing multiple transmit and receive antenna structures with the antenna array having M-elements wherein we could choose to reuse only a subset of the orthogonal codes or choose a code reuse factor less than M (See Fig. 2-3, Col 8, lines 30-33).

A person of ordinary skill in the art would have been motivated to employ Huang in Scherzer in order to obtain a practical wireless communication systems and methods for enhancement by exploiting the spatial domain and to take advantage of reusing only a subset of the orthogonal codes or choose a code reuse factor less than M with the antenna array has M-elements in claims 2 and 6.

The suggestion/motivation to do so would have been to accommodate practical wireless communication systems and methods for enhancement by exploiting the spatial domain and to take advantage of reusing only a subset of the orthogonal codes or choose a code reuse factor less than M with the antenna array has M-elements in

claims 2 and 6. At the time the invention was made, therefore, it would have been obvious to one of ordinary skill in the art to which the invention pertains to combine Huang with Scherzer to obtain the inventions specified in claims 2 and 6.

Regarding claims 3 and 7, these claims have limitations that is similar to those of claims 1 and 5 and Scherzer further teaches that preparing beamforming information by the channel estimator (11) comprises a set of N despreaders (102) for dispreading the signal received from the desired subscriber stations and followed by corresponding set of N fast Hadamard transformers and a spatial correlator (105) (spatial filters) (See Fig. 1, Col 7, lines 15-18), thus it is rejected with the same rationale applied against claims 1 and 5 above.

Regarding claims 12-19, these claims have limitations that is similar to those of claims 1 and 5, thus it is rejected with the same rationale applied against claims 1 and 5 above.

Allowable Subject Matter

4. Claims 4 and 8-10 are allowable.

Examiner's Statement of Reasons for Allowance

5. The following is an examiner's statement of reasons for allowance:

The prior art along or in combination fails to teach or make obvious the following limitations:

"the step of beamforming comprises receiving from the subscriber stations to a spatial signature vector that is comprised of path amplitude and phase from each of m BS antenna elements, and where the BS, from the spatial signature vectors received from a plurality of same-code subscriber stations, computes antenna element weight vectors" as recited in the *independent claims 4 and 10,*

"said system has a maximum system capacity of .alpha.MP channels" as recited in the *independent claim 8,*

"for a case of independent fading on each antenna element of said antenna array, said system achieves a diversity gain of M, where M is equal to the number of antenna elements of said antenna array" as recited in the *independent claim 9.*

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Richard Chang whose telephone number is (571) 272-3129. The examiner can normally be reached on Monday - Friday from 8 AM to 5 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ricky Ngo can be reached on (571) 272-3139. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

rkc

Richard Chang
Patent Examiner
Art Unit 2663

RICKY NGO
PRIMARY EXAMINER

7/11/05